CLAIMS

What is claimed is:

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1.   A network access server (NAS) providing a connection to a user in a data

5   communications network, said NAS capable of communicating with a home gateway

server (HGS) maintaining a pool of IP addresses for allocation to authorized users

associated with the NAS, said NAS comprising:

a first memory location for storing an identification of a user;

an authenticator for asking the HGS for an IP address on behalf of the user; and

10   a second memory location associated with the first memory for storing the IP

address of the user received from the HGS.

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2.   The network access server of claim 1, further comprising:

a detector for periodically detecting connection of the user to the NAS;

15   a keep-alive sender for periodically informing the HGS that the user is still

connected to the NAS.

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3.   The network access server of claim 1, further comprising:

a receiver for receiving periodic queries from the HGS about the status of the user

20   connection to the NAS;

a responder responsive to said periodic queries for informing the HGS that the use

is still connected to the NAS.

Sub B 4. The network access server of claim 1, further comprising:

a receiver for receiving periodic signals from the user;

a forwarder responsive to said receiver for forwarding information to the HGS that the user is still connected to the NAS.

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5. The network access server of claim 1, further comprising:

an HGS identifier responsive to log-in information provided by the user for identifying an HGS to which to forward the user's request for an IP address.

10   6. The network access server of claim 2, further comprising:

an HGS identifier responsive to log-in information provided by the user for identifying an HGS to which to forward the user's request for an IP address.

7. The network access server of claim 3, further comprising:

15   an HGS identifier responsive to log-in information provided by the user for identifying an HGS to which to forward the user's request for an IP address.

8. The network access server of claim 4, further comprising:

an HGS identifier responsive to log-in information provided by the user for

20   identifying an HGS to which to forward the user's request for an IP address.

Sub B 9. The network access server of claim 1, further comprising:

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An HGS identifier responsive to call information associated with the incoming line used by the user to access the NAS for identifying an HGS to which to forward the user's request for an IP address.

10. The network access server of claim 2, further comprising:

5   An HGS identifier responsive to call information associated with the incoming line used by the user to access the NAS for identifying an HGS to which to forward the user's request for an IP address.

11. The network access server of claim 3, further comprising:

10   An HGS identifier responsive to call information associated with the incoming line used by the user to access the NAS for identifying an HGS to which to forward the user's request for an IP address.

12. The network access server of claim 4, further comprising:

15   An HGS identifier responsive to call information associated with the incoming line used by the user to access the NAS for identifying an HGS to which to forward the user's request for an IP address.

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13.   The network access server of claim 1, further comprising:

20   a generator, responsive to the receipt of a disconnection request from the user, for generating and sending a notice to the HGS that the user is no longer connected to the NAS.

14. The network access server of claim 2, further comprising:

a generator, responsive to the receipt of a disconnection request from the user, for generating and sending a notice to the HGS that the user is no longer connected to the NAS.

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15. The network access server of claim 3, further comprising:

a generator, responsive to the receipt of a disconnection request from the user, for generating and sending a notice to the HGS that the user is no longer connected to the NAS.

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16. The network access server of claim 4, further comprising:

a generator, responsive to the receipt of a disconnection request from the user, for generating and sending a notice to the HGS that the user is no longer connected to the NAS.

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17. The network access server of claim 1, further comprising:

a relayer responsive to the IP address for the user received from the HGS for informing the user of its IP address.

20   18. The network access server of claim 2, further comprising:

a relayer responsive to the IP address for the user received from the HGS for informing the user of its IP address.

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19.   The network access server of claim 3, further comprising:

a relayer responsive to the IP address for the user received from the HGS for

informing the user of its IP address.

5   20.   The network access server of claim 4, further comprising:

a relayer responsive to the IP address for the user received from the HGS for

informing the user of its IP address.

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21.   A method for providing an IP address to a user in a data communications

10   network, the method comprising:

establishing a connection with a user;

receiving an identification and a request for an IP address from the user;

storing the identification in memory;

requesting the IP address from a home gateway server (HGS) on behalf of the

15   user;

receiving the IP address from a remote server;

storing the IP address in memory; and

transmitting the IP address to the user.

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20   22.   The method of claim 21, further comprising:

detecting a continuing connection with the user; and

sending periodic keep-alive messages associated with the user to the remote

server for as long as continued connection with the user is detected.

23.   The method of claim 21, further comprising:

receiving periodic queries from the HGS about the status of the user connection; and

5   responding to said periodic queries that the user is still connected.

24.   The method of claim 21, further comprising:

receiving periodic in-use signals from the user; and

forwarding information to the HGS that the user is still connected.

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25.   The method of claim 24, further comprising:

identifying an HGS to which to forward the user's request for an IP address, said

identifying in response to call information associated with an incoming line used by the

user.

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26.   A program storage device readable by a machine, tangibly embodying a program

of instructions readable by the machine to perform a method for providing an IP address

to a user in a data communications network, the method comprising:

establishing a connection with a user;

20   receiving an identification and a request for an IP address from the user;

storing the identification in memory;

requesting the IP address from a home gateway server (HGS) on behalf of the

user;

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receiving the IP address from a remote server;

storing the IP address in memory; and

transmitting the IP address to the user.

5   27. The method of claim 26, further comprising:

detecting a continuing connection with the user; and

sending periodic keep-alive messages associated with the user to the remote

server for as long as continued connection with the user is detected.

10   28. The method of claim 26, further comprising:

receiving periodic queries from the HGS about the status of the user connection;

and

responding to said periodic queries that the user is still connected.

15   29. The method of claim 26, further comprising:

receiving periodic in-use signals from the user; and

forwarding information to the HGS that the user is still connected.

30. A home gateway server (HGS) capable of communication with a network access

20 server, said network access server (NAS) capable of communicating with a user, the

home gateway server comprising:

an IP address pool maintainer maintaining access to a pool of IP addresses;

a user identification maintainer maintaining the identification of a user;

an allocater for allocating an IP address to the user, said IP address allocated from the pool of IP addresses;

a memory for storing the IP address allocated to the user;

a sender for sending the IP address to the NAS for relaying to the user; and

5   a keep-alive message receiver for receiving keep-alive messages, said keep-alive messages originating from the NAS and indicating that the user is using the IP address.

31.   A home gateway server (HGS) capable of communication with a network access server, said network access server (NAS) capable of communicating with a user, the

10   home gateway server comprising:

an IP address pool maintainer maintaining access to a pool of IP addresses;

a user identification maintainer maintaining the identification of a user;

an allocater for allocating an IP address to the user, said IP address allocated from the pool of IP addresses;

15   a memory for storing the IP address allocated to the user;

a sender for sending the IP address to the NAS for relaying to the user; and

a in-use message receiver for receiving in-use messages, said in-use messages originating from the user and forwarded from the NAS and indicating that the user is using the IP address.

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32.   A home gateway server (HGS) capable of communication with a network access server, said network access server (NAS) capable of communicating with a user, the home gateway server comprising:

an IP address pool maintainer maintaining access to a pool of IP addresses;

a user identification maintainer maintaining the identification of a user;

an allocater for allocating an IP address to the user, said IP address allocated from the pool of IP addresses;

5   a memory for storing the IP address allocated to the user;

a sender for sending the IP address to the NAS for relaying to the user;

a query sender for sending queries to the NAS as to whether the user is connected to the NAS; and

a response-to-query message receiver for receiving response-to-query messages in
10   response to queries, said response-to-query messages indicating that the user is using the IP address.

33.   The home gateway server of claim 30, further comprising:

a disconnect notice receiver for receiving a disconnect notice originating from the
15   user and forwarded from the NAS indicating that the user is no longer using the IP address.

34.   The home gateway server of claim 31, further comprising:

a disconnect notice receiver for receiving a disconnect notice originating from the
20   user and forwarded from the NAS indicating that the user is no longer using the IP address.

35.   The home gateway server of claim 32, further comprising:

a disconnect notice receiver for receiving a disconnect notice originating from the user and forwarded from the NAS indicating that the user is no longer using the IP address.

5   36.   A method for providing a network access server (NAS) an IP address for use by a user in a data communications network, the method comprising:

allocating an IP address for use by the user from a pool of IP addresses; and

sending the IP address to the network access server; and

receiving keep-alive messages associated with the user, said keep-alive messages

10   originating from the NAS and indicating that the user is using the IP address.

37.   A method for providing a network access server (NAS) an IP address for use by a user in a data communications network, the method comprising:

allocating an IP address for use by the user from a pool of IP addresses;

15   sending the IP address to the network access server; and

receiving in-use messages associated with the user, said in-use messages

originating from the user and forwarded from the NAS and indicating that the user is using the IP address.

20   38.   A method for providing a network access server (NAS) an IP address for use by a user in a data communications network, the method comprising:

allocating an IP address for use by the user from a pool of IP addresses;

sending the IP address to the network access server;

sending queries as to whether the user is using the IP address; and

receiving response-to-query messages in response to said queries, said response-to-query messages indicating that the user is using the IP address.

5   39.   The method of claim 36, further comprising:

receiving a disconnect notice originating from the user and forwarded from the NAS indicating that the user is no longer using the IP address.

40.   The method of claim 37, further comprising:

10   receiving a disconnect notice originating from the user and forwarded from the NAS indicating that the user is no longer using the IP address.

41.   The method of claim 38, further comprising:

receiving a disconnect notice originating from the user and forwarded from the

15   NAS indicating that the user is no longer using the IP address.

42.   A program storage device readable by a machine, tangibly embodying a program of instructions readable by the machine to perform a method for providing a network access server (NAS) an IP address for use by a user in a data communications network,

20   the method comprising:

allocating an IP address for use by the user from a pool of IP addresses;

sending the IP address to the network access server; and

receiving keep-alive messages associated with the user, said keep-alive messages originating from the NAS and indicating that the user is using the IP address.

43. A program storage device readable by a machine, tangibly embodying a program

5 of instructions readable by the machine to perform a method for providing a network access server (NAS) an IP address for use by a user in a data communications network, the method comprising:

allocating an IP address for use by the user from a pool of IP addresses;

sending the IP address to the network access server;

10 receiving in-use messages associated with the user, said in-use messages originating from the user and forwarded from the NAS and indicating that the user is using the IP address.

15 44. A program storage device readable by a machine, tangibly embodying a program of instructions readable by the machine to perform a method for providing a network access server (NAS) an IP address for use by a user in a data communications network, the method comprising:

allocating an IP address for use by the user from a pool of IP addresses;

20 sending the IP address to the network access server;

sending queries as to whether the user is using the IP address; and

receiving response-to-query messages in response to said queries, said response-to-query messages indicating that the user is using the IP address.